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ABSTRACT

As colleges and universities consider various options for wide scale "computerization," one southern liberal arts university has instituted a technology program that insures that all students have equal access to laptop computers. At this university, each student is issued his or her own IBM ThinkPad, and activities involving this computer are infused throughout the academic and social life of the campus. This study examined the computer uses and attitudes of male and female students who had experienced a technology-rich environment for four years. Participants in the study were students in the Class of 2000 at this ubiquitous computing university. Approximately 800 students were surveyed near the end of their senior year to obtain their self-reports of computer use and computer attitudes. Overall, use data indicated that students used the computer in various ways. Students reported that they used the computer "often" for: word processing (97%); e-mail for pleasure (98%); e-mail for classes (73%); and Web resources for classes (50%). For further analysis, the frequency of individual use was added and the following categories were created to form scores: Tool; Communication; Resources; Entertainment; and Total Use. These categories of use were compared for males and females using independent T-tests. Results showed that males were more frequent users in the categories of Resources, Entertainment, and Total Use. There were no significant differences for Tool Use or Communication. On the attitude survey items, 73% of the students reported that they "loved" computers, while 23% "liked" them, 4% "disliked" them, and 1% "hated" them. Eighty-three percent of the seniors felt that the ThinkPad had significantly impacted the campus culture, 75% felt that it had helped in their overall educational life, and 48% felt that it had helped in their overall social life. Responses on all of these attitude items were independent of gender. (Contains 17 references.) (AEF)

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Gender Differences in Computer Use and Attitudes on a Ubiquitous Computing Campus

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As colleges and universities consider various options for wide scale "computerization," one southern liberal arts university has instituted a technology program that insures that all students have equal access to laptop computers. At this university each student is issued his or her own IBM ThinkPad, and activities involving this computer are infused throughout the academic and social life of the campus. Students use the computer extensively in class activities and projects and also in social communication and entertainment.

We are all familiar with the classic studies of gender differences in mathematics, science, and technology. Even though there has been recent progress in fostering gender equity in these subjects, there are still disturbing differences in use and attitudes (AAUW, 1998; Campbell & Bailey, 1999; Campbell & Clewell, 1999).

Much has been written about the infusion of technology into academic life. While colleges are moving at different paces in its integration, we all recognize that technology is an integral part of education in the 21st century (Brown, 2000, 1999). Research studies describe an intensive computing environment as a positive influence on academics

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(Corwin & Marcinkiewicz, 1998; Geissler & Horridge, 1998; Mitra & Steffensmeier, 2000; Walters & Necessary 1996).

Previous studies have shown marked differences between male and female use of and attitudes toward computers (Chen, 1985; Collis, 1985; Fetler, 1985; Lockheed, 1985; Lockheed, Nielsen, & Stone, 1983; Sadker, 1999; Sheingold, 1981). This study sought to examine the computer uses and attitudes of male and female students who had experienced a technology-rich environment for four years.

Methodology

Participants in this study were the students of the Class of 2000 at this ubiquitous computing university. At the end of their fourth year, this senior class had lived and worked in a computer-intensive environment for their entire college career. Approximately 800 students were surveyed near the end of their senior year to obtain their self- reports of computer use and computer attitudes.

A survey was constructed to obtain use and attitude data. The survey was posted online (with a CGI script to encode responses in a text file) and an email message was sent to all 800 seniors encouraging them to follow the included link and complete the survey. After one week, a reminder email was sent. Then after another week, a paper version of the survey was sent to all students who had not responded. After two more weeks, a random sample of the remaining nonresponders were interviewed by phone and asked the survey questions. To check for representativeness, Computer Expertise scores were compared for the three groups (web (n=274), paper (n=35), phone interview (n=10)) and there were no significant differences ($F(2, 316) = 0.391$, $p=0.67$).

Results

Overall Use data indicated that students used the computer in varied ways. Students reported that they used the computer "often" for Word Processing (97%), Email for Pleasure (98%), Email for Classes (73%), and WWW Resources for Classes (50%). For further analysis, the frequencies of individual uses were summed within categories to form scores for Tool, Communication, Resources, Entertainment, and Total Use. These categories of use were compared for males and females by Independent T-tests. Results revealed significant gender differences for Resources ($t(317)=2.930$, $p<.05$), Entertainment ($t(317)==4.979$, $p<.05$), and Total Use ($t(317)=2.045$, $p<.05$). Examination of the means showed that males were more frequent users in all three. There were no significant differences for Tool Use or Communication.

These data were further analyzed by including gender and 11 classifications of major as predictor variables (coded as dummy variables) in a Stepwise Multiple Regression with Total Use and then each of the four Use subscores as the criterion variable. In four of the five analyses, gender was excluded as a variable in the equation ($p >.01$). The regression equation for Total Use included two significant variables: Business major (beta=.233) and History major (beta=-.144), ($R^2 = .084$, $F(2,316)=15.493$, $p< .01$). The equation for Tool Use included History major (beta=-.323), English major (beta=-.274), and Communications major (beta=-.186), ($R^2= .190$, $F(3,315)=24.563$, $p< .01$). Communication Use was not significantly related to any of the predictor variables ($R^2= .020$, $F(1,317)=6.418$, $p> .01$). Resources Use was predicted by Business major (beta=. 259), ($R^2= .064$, $F(1,317)=22.811$, $p< .01$). The only dependent

variable for which gender was a significant predictor (beta=-.259) was Entertainment Use, where males were more positive (R^2= .064, F(1,317)=22.789, p< .01).

On the attitude items, 73% of students reported that they "loved" computers, while 23% "liked" them, 4% "disliked" them, and 1% "hated" them. 83% of the seniors felt that the ThinkPad had significantly impacted the campus culture. 75% felt that it had helped in their overall educational life, and 48% felt that it had helped in their overall social life. Responses on all of these attitude items were independent of gender (Chi-Squares (n=318) = 0.541, 0.731, 2.801, and 7.051, all p>.01). The one remaining item was related to gender: Self-report of Computer Expertise ranging from 1 (Neanderthal) to 5 (Bill Gates, Jr.) (Chi-Square (4, n=316)=22.438, p<.01).

Conclusions

On this campus all students had exactly the same computer and used it for various academic and non-academic tasks. Comparison of Use category scores by gender found differences for males and females. However, when this data was further analyzed considering both gender and major, the variance from gender differences was accounted for by the "major" variable in all Use categories except Entertainment. The only difference was that males used the computer more for games and music. Attitudes toward computers were positive, and were not different for males and females, but the males rated their computer expertise higher than did the females.

This study indicates a "leveling" effect when males and females have equal computer access, as suggested in the earlier work of Arch and Cummins (1989), Kolehmainen (1992), and Sacks, Bellisimo, and Mergendoller (1993-94). The frequency

of utilization of the computer for tool, communication, and resource location tasks was not different for males and females. The amount of Total Use was not different. Males used their computers more for entertainment, playing games, music, and movies. Similarly, there were no differences in self-reported attitudes toward the computer, but males rated their expertise higher than females. The implicit cultural messages that have impeded females' computer use seemed to be overcome when the technology environment was equivalent for male and female students. Further study is recommended to further track and verify this apparent trend toward equity in computer use and attitudes.

References

American Association of University Women (AAUW). (1998). Gender gaps: Where schools still fail our children. Washington, DC: Author.

Arch, E. C. & Cummins, D. E. (1989). Structured and unstructured exposure to computers: Sex differences in attitude and use among college students. *Sex Roles, 20* (5 - 6), 245-255.

Brown, D. G. (2000). Computing environment at Wake Forest University. In D.G. Brown (Ed.), *Teaching with Technology* (pp. 41-42). Boston, MA: Anker.

Brown, D. G. (1999). *Electronically enhanced education: A case study of Wake Forest University*. Winston-Salem, NC: Wake Forest University Press.

Campbell, P. B. & Bailey, S. M. (1999, May). *From statistics to stories: Girls and math and science in 1999 and the implications for engineering.* Paper presented at National Academy of Engineering, Washington, DC.

Campbell, P. B. & Clewell, B. C. (1999). Science, math, and girls. *Educational Week: Editorial Projects in Education, 19* (2), 50-53.

Chen, M. (1985). A macro-focus on microcomputers. In M. Chen and W. Paisley (Eds.), Children and Microcomputers (pp. 37-58). Beverly Hills, CA: Sage.

Corwin, T. & Marcinkiewicz, H. (1998). Prediction of and differences in computer use when universally available. (ERIC No. ED 423 832).

Fetler, M. (1985). Sex differences on the California Statewide Assessment of Computer Literacy. *Sex Roles, 13* (3 - 4), 181-191.

Geissler, J. E. & Horridge, P. (1998). University students' computer knowledge and commitment to learning. *Journal of Research on Computing in Education, 25* (3), 347-365.

Kolehmainen, P. (1992, June). *The changes in computer anxiety in a required computer course.* Paper presented at the European Conference on Educational Research, Enschede, The Netherlands. (ERIC No. ED 350 957).

Lockheed, M. (1985). Women, girls, and computers: A first look at the evidence. *Sex Roles, 13* (3-4), 115-22.

Lockheed, M., Nielsen, A., & Stone, M. (1983, April). *Sex differences in microcomputer literacy.* Paper presented at the National Educational Computer Conference, Baltimore, MD.

Mitra, A. & Steffensmeier, T. (2000, Spring). Changes in student attitudes and student computers use in a computer-enriched environment. *Journal of Research on Computing in Education, 32*, (3), 416-433.

Sacks, C. H., Bellisimo, Y., & Mergendoller, J. (1993-94, Winter). Attitudes toward computers and computer use: The issue of gender. *Journal of Research on Computing Education, 26*(2), 256-269.

Sadker, D. (1999). Gender equity: Still knocking at the classroom door. *Educational Leadership, 56*, 25.

Walters, J. & Necessary, J. (1996). An attitudinal comparison toward computers between underclassmen and graduating seniors. *Education*, 116, 623-630.